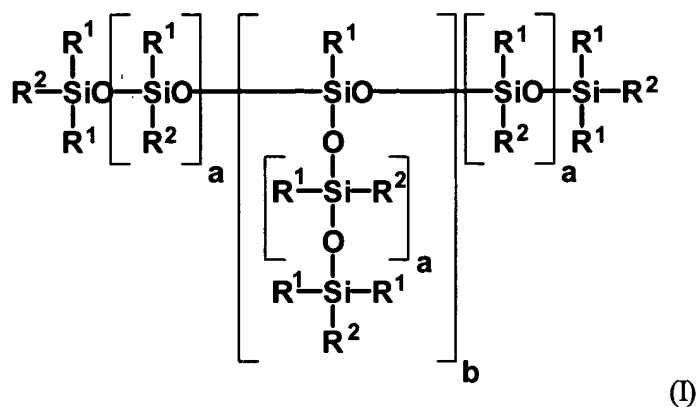Claims:

1. An organopolysiloxane copolymer comprising, on average, at least one polyester group bonded to a siloxane via a spacer and, on average, at least one hydrophilic group bonded to the siloxane via a spacer, of the general formula (I):
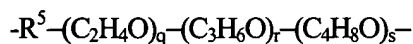

(I)

in which

R^1 are identical or different and are alkyl radicals having 1 to 30 carbon atoms or phenyl radicals,

R^2 independently of one another are R^1, -A-R^3 or –B-R^4

in which

-A-   is a divalent alkyleneoxy group having 3 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

and/or is a divalent polyoxyalkylene group of the general average formula

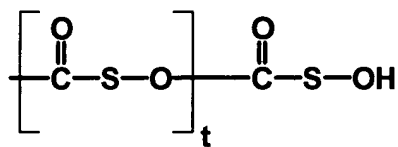$-R^5-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-$

in which

q =   1 to 100,

r =   0 to 100,

s =   0 to 100,

R^5 is a divalent alkyleneoxy group having 1 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

R^3 is a polyester radical of the general formula

18

$$\left[\begin{matrix} \overset{\displaystyle O}{\underset{\displaystyle \|}{C}}-S-O \end{matrix}\right]_t \overset{\displaystyle O}{\underset{\displaystyle \|}{C}}-S-OH$$

in which

t   is integers in the range from 1 to 10, and [-(O=C)-S-O-] is the fragment of a corresponding hydroxycarboxylic acid HO-(O=C)-S-OH, in which

-S-   is an optionally branched and/or double-bond-containing alkylene radical having 5 to 30 carbon atoms, with the proviso that at least 5 carbon atoms are between the carboxyl group [HO-C(O)-] and the hydroxyl group [-OH];

-B-   acts as a spacer between siloxane backbone and the radical R^4,

R^4 is a hydrophilic radical of the general average formula

-R^6-$(C_2H_4O)_q$-$(C_3H_6O)_r$-$(C_4H_8O)_s$-R^7 in which

q =   1 to 100,

r =   0 to 100,

s =   0 to 100,

R^6 is a divalent alkylene or alkyleneoxy group having 1 to 24 carbon atoms which is optionally branched and/or can contain double bonds;

R^7 is a hydrogen atom, alkyl or acyl radical having 1 to 20 carbon atoms, or

R^4 is a polyhydroxyorganyl radical, in particular a glycerol, polyglycerol, sugar or sugar derivative radical, a polyvinyl alcohol radical, a carboxylate, sulfate or phosphate radical, an ammonium radical or an amphoteric betaine or amphoglycinate radical,
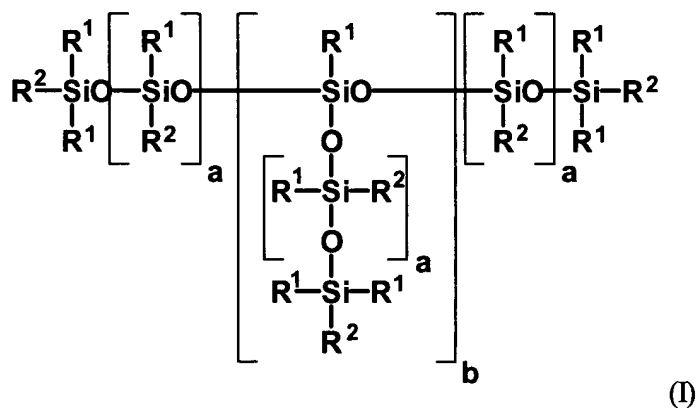
a   has a value from 1 to 1000, and

b   has a value from 0 to 10

with the proviso that, on statistical average, at least in each case one radical R^2 =

–A-R^3 and R^2 = –B-R^4 is present, or in the case where no radical –B-R^4 is present, at least one radical R^2 = –A-R^3 is present in which –A- is a divalent polyoxyalkylene group of the above-described general average formula -R^5–(C$_2$H$_4$O)$_q$–(C$_3$H$_6$O)$_r$–(C$_4$H$_8$O)$_s$–.

2. The organopolysiloxane copolymer as claimed in claim 1, wherein the fragment [-(O=C)-S-O-]$_t$ corresponds to the radical of 12-hydroxystearic acid or of ricinoleic acid and t is between 2 and 5.

3. The organopolysiloxane copolymer as claimed in claim 1, wherein the hydrophilic radical R^4 is a radical selected from the group consisting of polyethers, polyglycerol, polyvinyl alcohol, sugar and sugar derivatives.

4. The organopolysiloxane copolymer as claimed in claim 1, wherein b = 0 and a = 10 to 150.

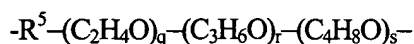5. A process for the preparation of a compound of general formula (I)

(I)

in which

R^1 are identical or different and are alkyl radicals having 1 to 30 carbon
        atoms or phenyl radicals,

R^2 independently of one another are R^1, -A-R^3 or –B-R^4
        in which

-A-   is a divalent alkyleneoxy group having 3 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

and/or is a divalent polyoxyalkylene group of the general average formula

$-R^5-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-$
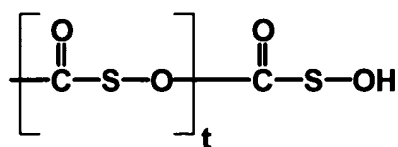
in which

q =   1 to 100,

r =   0 to 100,

s =   0 to 100,

R^5 is a divalent alkyleneoxy group having 1 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

R^3 is a polyester radical of the general formula

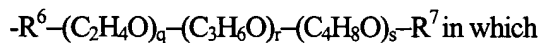$$\left[\begin{array}{c} O \\ \parallel \\ -C-S-O- \end{array} \right]_t \begin{array}{c} O \\ \parallel \\ -C-S-OH \end{array}$$

in which

t   is integers in the range from 1 to 10, and [-(O=C)-S-O-] is the fragment of a corresponding hydroxycarboxylic acid HO-(O=C)-S-OH, in which

   -S-   is an optionally branched and/or double-bond-containing alkylene radical having 5 to 30 carbon atoms, with the proviso that at least 5 carbon atoms are between the carboxyl group [HO-C(O)-] and the hydroxyl group [-OH];

-B-   acts as a spacer between siloxane backbone and the radical R^4,

R^4 is a hydrophilic radical of the general average formula

$-R^6-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-R^7$ in which

q =   1 to 100,

r =   0 to 100,

s =   0 to 100,

R^6 is a divalent alkylene or alkyleneoxy group having 1 to 24 carbon atoms which is optionally branched and/or can contain double bonds;

R^7 is a hydrogen atom, alkyl or acyl radical having 1 to 20 carbon atoms, or

R^4 is a polyhydroxyorganyl radical, in particular a glycerol, polyglycerol, sugar or sugar derivative radical, a polyvinyl alcohol radical, a carboxylate, sulfate or phosphate radical, an ammonium radical or an amphoteric betaine or amphoglycinate radical,

a has a value from 1 to 1000, and
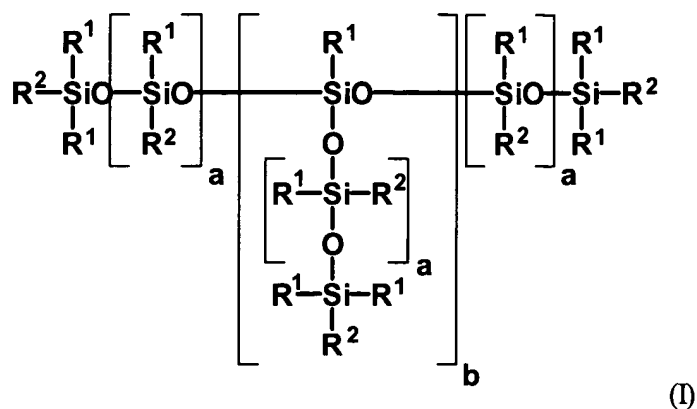
b has a value from 0 to 10

with the proviso that, on statistical average, at least in each case one radical $R^2 = -A-R^3$ and $R^2 = -B-R^4$ is present, or in the case where no radical $-B-R^4$ is present, at least one radical $R^2 = -A-R^3$ is present in which $-A-$ is a divalent polyoxyalkylene group of the above-described general average formula $-R^5-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-$, which comprises adding on polyester radicals either by hydrosilylation of a polyester carrying a double bond to a polyhydrogensiloxane, or by esterification of an OH-functional polysiloxane with a polyester carrying a free carboxyl group.

6. The method of claim 5, wherein the fragment $[-(O=C)-S-O-]_t$ corresponds to the radical of 12-hydroxystearic acid or of ricinoleic acid and t is between 2 and 5.

7. The method of claim 5, wherein the hydrophilic radical R^4 is a radical selected from the group consisting of polyethers, polyglycerol, polyvinyl alcohol, sugar and sugar derivatives.

8. The method of claim 5, wherein b = 0 and a = 10 to 150.

9. A dispersion or emulsion comprising at least one of compound of general formula (I)
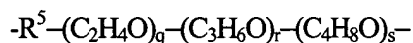
22

(I)

in which

R^1 are identical or different and are alkyl radicals having 1 to 30 carbon atoms or phenyl radicals,

R^2 independently of one another are R^1, -A-R^3 or –B-R^4

in which

-A- is a divalent alkyleneoxy group having 3 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

and/or is a divalent polyoxyalkylene group of the general average formula

-R^5–(C$_2$H$_4$O)$_q$–(C$_3$H$_6$O)$_r$–(C$_4$H$_8$O)$_s$–

in which
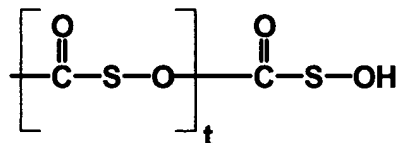
q = 1 to 100,

r = 0 to 100,

s = 0 to 100,

R^5 is a divalent alkyleneoxy group having 1 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

R^3 is a polyester radical of the general formula

in which

23

t is integers in the range from 1 to 10, and [-(O=C)-S-O-] is the fragment of a corresponding hydroxycarboxylic acid HO-(O=C)-S-OH, in which

    -S- is an optionally branched and/or double-bond-containing alkylene radical having 5 to 30 carbon atoms, with the proviso that at least 5 carbon atoms are between the carboxyl group [HO-C(O)-] and the hydroxyl group [-OH];

-B- acts as a spacer between siloxane backbone and the radical R^4,

R^4 is a hydrophilic radical of the general average formula

  $-R^6-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-R^7$ in which

  $q = $ 1 to 100,

  $r = $ 0 to 100,

  $s = $ 0 to 100,

  R^6 is a divalent alkylene or alkyleneoxy group having 1 to 24 carbon atoms which is optionally branched and/or can contain double bonds;

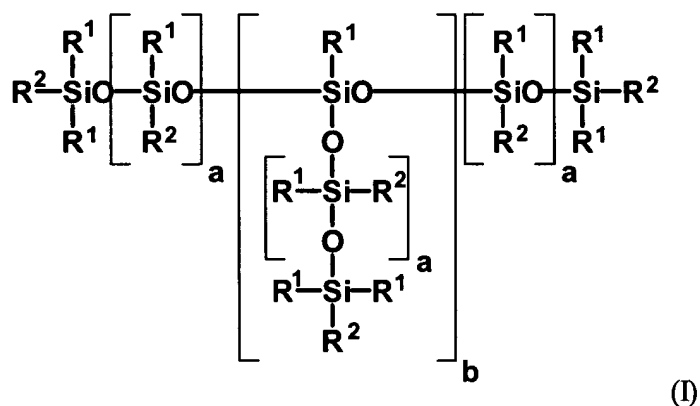 R^7 is a hydrogen atom, alkyl or acyl radical having 1 to 20 carbon atoms, or

R^4 is a polyhydroxyorganyl radical, in particular a glycerol, polyglycerol, sugar or sugar derivative radical, a polyvinyl alcohol radical, a carboxylate, sulfate or phosphate radical, an ammonium radical or an amphoteric betaine or amphoglycinate radical,

a has a value from 1 to 1000, and

b has a value from 0 to 10

with the proviso that, on statistical average, at least in each case one radical $R^2 = -A-R^3$ and $R^2 = -B-R^4$ is present, or in the case where no radical $-B-R^4$ is present, at least one radical $R^2 = -A-R^3$ is present in which -A- is a divalent polyoxyalkylene group of the above-described general average formula $-R^5-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-$.

10.　　The dispersion or emulsion of claim 9 further comprising additional emulsifiers which when used in conjunction with the compound of general formula (I) provide a low-viscosity W/O emulsion having a high content of a dispersed phase.

11.　　The dispersion or emulsion of claim 9, wherein the fragment [-(O=C)-S-O-]$_t$ corresponds to the radical of 12-hydroxystearic acid or of ricinoleic acid and t is between 2 and 5.

12.　　The dispersion or emulsion of claim 9, wherein the hydrophilic radical R^4 is a radical selected from the group consisting of polyethers, polyglycerol, polyvinyl alcohol, sugar and sugar derivatives.

13.　　The dispersion or emulsion of Claim 9, wherein b = 0 and a = 10 to 150.

14.　　A cosmetic W/O emulsion comprising 0.5 to 4% by weight, based on the total formulation, of at least one of compound of general formula (I)
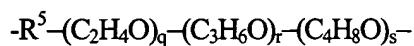

(I)

in which

R^1　　are identical or different and are alkyl radicals having 1 to 30 carbon atoms or phenyl radicals,

R^2　　independently of one another are R^1, -A-R^3 or –B-R^4 in which

-A-   is a divalent alkyleneoxy group having 3 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

and/or is a divalent polyoxyalkylene group of the general average formula

$-R^5-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-$
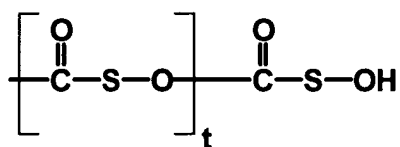
in which

q =   1 to 100,

r =   0 to 100,

s =   0 to 100,

R^5 is a divalent alkyleneoxy group having 1 to 24 carbon atoms, which is optionally branched and/or can contain double bonds,

R^3 is a polyester radical of the general formula

$$\left[\begin{matrix} O \\ \| \\ -C-S-O- \end{matrix} \right]_t \begin{matrix} O \\ \| \\ -C-S-OH \end{matrix}$$
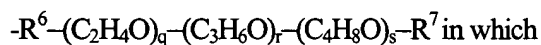
in which

t   is integers in the range from 1 to 10, and [-(O=C)-S-O-] is the fragment of a corresponding hydroxycarboxylic acid HO-(O=C)-S-OH, in which

            -S-   is an optionally branched and/or double-bond-containing alkylene radical having 5 to 30 carbon atoms, with the proviso that at least 5 carbon atoms are between the carboxyl group [HO-C(O)-] and the hydroxyl group [-OH];

-B-   acts as a spacer between siloxane backbone and the radical R^4,

R^4 is a hydrophilic radical of the general average formula

$-R^6-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-R^7$ in which

q =   1 to 100,

r =   0 to 100,

s =   0 to 100,

R^6 is a divalent alkylene or alkyleneoxy group having 1 to 24 carbon atoms which is optionally branched and/or can contain double bonds;

R^7 is a hydrogen atom, alkyl or acyl radical having 1 to 20 carbon atoms, or

R^4 is a polyhydroxyorganyl radical, in particular a glycerol, polyglycerol, sugar or sugar derivative radical, a polyvinyl alcohol radical, a carboxylate, sulfate or phosphate radical, an ammonium radical or an amphoteric betaine or amphoglycinate radical,

a   has a value from 1 to 1000, and

b   has a value from 0 to 10

with the proviso that, on statistical average, at least in each case one radical $R^2 = -A-R^3$ and $R^2 = -B-R^4$ is present, or in the case where no radical $-B-R^4$ is present, at least one radical $R^2 = -A-R^3$ is present in which $-A-$ is a divalent polyoxyalkylene group of the above-described general average formula $-R^5-(C_2H_4O)_q-(C_3H_6O)_r-(C_4H_8O)_s-$.

15.   The cosmetic W/O emulsion of claim 14, wherein the fragment $[-(O=C)-S-O-]_t$ corresponds to the radical of 12-hydroxystearic acid or of ricinoleic acid and t is between 2 and 5.

16.   The cosmetic W/O emulsion of claim 14, wherein the hydrophilic radical R^4 is a radical selected from the group consisting of polyethers, polyglycerol, polyvinyl alcohol, sugar and sugar derivatives.

17.   The cosmetic W/O emulsion of claim 14, wherein b = 0 and a = 10 to 150.